

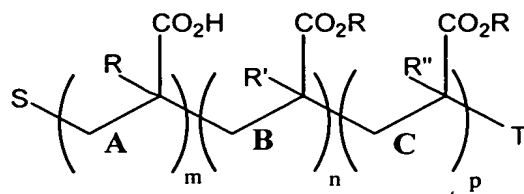
CLAIMS

We claim:

1. An oil-absorbing composition comprising an aqueous emulsion polymer having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and optionally, one or more cross-linking agents, the oil-absorbing composition absorbing at least 20 weight percent of at least one oily substance or at least one hydrophobic material in a heterogeneous medium, based on the total weight of the polymer composition.
2. The oil-absorbing composition of claim 1, wherein the ionic monomer is (meth)acrylic acid and wherein the hydrophobic monomers are selected from the group consisting of C₁-C₂₄ alkyl acrylates, C₁-C₂₄ alkyl (meth)acrylates, methyl(meth)acrylate, ethyl acrylate (EA), isopropyl (meth)acrylate, butyl acrylate(BA), butyl (meth)acrylate (BMA), 2-ethyl hexyl acrylate, benzyl (meth)acrylate, octyl acrylate, decyl acrylate, lauryl acrylate, lauryl (meth)acrylate (LMA), oleyl (meth)acrylate, palmityl (meth)acrylate, stearyl (meth)acrylate (SMA), cetyl(meth)acrylate, eicosyl(meth)acrylate, blends of C₁₀-C₂₄ alkyl (meth)acrylates, cetyl-eicosyl (meth)acrylate (CEMA); aromatic and alkyl aromatic esters of (meth)acrylic acid, unsaturated vinyl esters of (meth)acrylic acid derived from fatty acids and fatty alcohols and combinations thereof.
3. The oil-absorbing composition of claim 2, the aqueous emulsion polymer having a weight average molecular weight ranging from 1000 to 600,000.
4. The oil-absorbing composition of claim 3, the composition further comprising one or more cross-linking agents selected from the group consisting of allyl (meth)acrylate, ethylene glycol di(meth)acrylate (EGDMA), butylene glycol di(meth)acrylate (BGDMA), methylene bisacrylamide, pentaerythritol diacrylate, pentaerythritol triacrylate, pentaerythritol tetraacrylate, divinylbenzene, polyethylene glycol diacrylate, bisphenol A diacrylates and combinations thereof.
5. The oil-absorbing composition of claim 4, wherein the composition further comprises a blend of aqueous emulsion polymers, each emulsion polymer

having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and optional cross-linking agents.

- 5 6. The oil-absorbing composition of claim 5, wherein the oil-absorbing composition is combined with at least one oily substance or hydrophobic material to produce an oil-containing composition, that is capable of releasing at least some of the oily substance or hydrophobic material on to a substrate.
- 10 7. The oil-absorbing composition of claim 6, wherein the oil-absorbing composition is in the form of a solid or liquid selected from the group consisting of spray dried powders, freeze dried powders, granules, films, water-borne latex dispersions and combinations thereof.
- 15 8. The oil-absorbing composition of claim 7, wherein the oil-absorbing composition is combined with at least one oily substance or a hydrophobic material and a carrier to produce an oil-containing composition, wherein the oil-containing composition is capable of releasing at least some of the oily substance or hydrophobic material on to a substrate in a heterogeneous medium.
- 20 9. The oil-absorbing composition of claim 8, wherein the oily substance or hydrophobic material is selected from the group consisting of body oils, sebum, squalene, proteins, protein containing substances, food, blood, fat, fatty acids, waxes, mineral oils, silicone oils, motor oils, crude oils, organic compounds, lipophilic toxins, pesticides, insecticides, herbicides, greases, vegetable oils and combinations thereof; wherein the substrate is selected from the group consisting of textiles, fabric, hard surfaces, ceramics, wood, tile asphalt, cement, skin and combinations thereof; and wherein the carrier is selected from the group consisting of plastics sheets, cosmetic strips, fibers, textiles, filter materials, paper products, inorganic solids, detergents, cleaners, soaps and combinations thereof.
- 25 10. The oil-absorbing composition of claim 9, wherein the composition is a terpolymer having the formula:
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wherein A is a polymerized residue of (meth)acrylic acid; wherein B is a polymerized residue of a monomer selected from one or more C₈-C₂₄ alkyl (meth)acrylates; wherein C is a residue of a monomer selected from one or more C₁-C₂₄ alkyl (meth)acrylates; and wherein the composition optionally includes at least one cross-linking agent, one or more radical initiators and one or more chain transfer agents.

11. A process for removing an oily substance or hydrophobic material from a substrate in a heterogeneous medium comprising the steps of directly contacting the substrate surface containing the oily substance or hydrophobic material with an oil-absorbing composition, wherein the composition comprises an aqueous emulsion polymer having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and optionally, one or more cross-linking agents, and wherein the oil-absorbing composition absorbs at least 20 weight percent of at least one oily substance or at least one hydrophobic material in a heterogeneous medium, based on the total weight of the polymer composition; allowing the oil-absorbing composition to absorb the oily substance or hydrophobic material; and removing the swollen oil-containing polymer composition from the medium.

12. The process according to claim 11, wherein the process is reversible.

13. The process according to claim 12, wherein the ionic monomer is (meth)acrylic acid and wherein the hydrophobic monomers are selected from the group consisting of C₁-C₂₄ alkyl acrylates, C₁-C₂₄ alkyl (meth)acrylates, methyl(meth)acrylate, ethyl acrylate (EA), isopropyl (meth)acrylate, butyl acrylate(BA), butyl (meth)acrylate (BMA), 2-ethyl hexyl acrylate, benzyl (meth)acrylate, octyl acrylate, decyl acrylate, lauryl acrylate, lauryl (meth)acrylate (LMA), oleyl (meth)acrylate, palmityl (meth)acrylate, stearyl (meth)acrylate (SMA), cetyl(meth)acrylate, eicosyl(meth)acrylate, blends of C₁₀-C₂₄ alkyl (meth)acrylates, cetyl-eicosyl (meth)acrylate (CEMA); aromatic

and alkyl aromatic esters of (meth)acrylic acid, unsaturated vinyl esters of (meth)acrylic acid derived from fatty acids and fatty alcohols and combinations thereof.

14. The process according to claim 13, the aqueous emulsion polymer having a weight average molecular weight ranging from 1000 to 600,000.

15. The process according to claim 14, wherein the oil-absorbing composition further comprises a blend of aqueous emulsion polymers, each emulsion polymer having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and optional cross-linking agents.

16. The process according to claim 15, wherein the oil-absorbing composition is in the form of a solid or liquid selected from the group consisting of spray dried powders, freeze dried powders, granules, films, water-borne latex dispersions and combinations thereof.

17. The process according to claim 16, wherein the oily substance or hydrophobic material is selected from the group consisting of body oils, sebum, squalene, proteins, protein containing substances, food, blood, fat, fatty acids, waxes, mineral oils, silicone oils, motor oils, crude oils, organic compounds, lipophilic toxins, pesticides, insecticides, herbicides, greases, vegetable oils and combinations thereof; wherein the substrate is selected from the group consisting of textiles, fabric, hard surfaces, ceramics, wood, tile asphalt, cement, skin and combinations thereof; and wherein the carrier is selected from the group consisting of plastics sheets, cosmetic strips, fibers, textiles, filter materials, paper products, inorganic solids, detergents, cleaners, soaps and combinations thereof.

18. A process for removing an oily substance or hydrophobic material in a heterogeneous medium including the steps of combining a substrate containing an oily substance, an oil-absorbing polymer composition, wherein the oil-absorbing composition comprises an aqueous emulsion polymer having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and optionally, one or more cross-linking agents and, optionally, a complexation agent to facilitate transport in the medium, wherein the oil-absorbing composition absorbs at least 20 weight percent of at least one oily substance or at least one

hydrophobic material in a heterogeneous medium, based on the total weight of the polymer composition; allowing the composition to absorb the oily substance or hydrophobic material; and separating the swollen oil-containing polymer composition from the medium.

- 5 19. The process according to claim 18, wherein the process is reversible.
- 10 20. The process according to claim 19, wherein the ionic monomer is (meth)acrylic acid and wherein the hydrophobic monomers are selected from the group consisting of C₁-C₂₄ alkyl acrylates, C₁-C₂₄ alkyl (meth)acrylates, methyl(meth)acrylate, ethyl acrylate (EA), isopropyl (meth)acrylate, butyl acrylate(BA), butyl (meth)acrylate (BMA), 2-ethyl hexyl acrylate, benzyl (meth)acrylate, octyl acrylate, decyl acrylate, lauryl acrylate, lauryl (meth)acrylate (LMA), oleyl (meth)acrylate, palmityl (meth)acrylate, stearyl (meth)acrylate (SMA), cetyl(meth)acrylate, eicosyl(meth)acrylate, blends of C₁₀-C₂₄ alkyl (meth)acrylates, cetyl-eicosyl (meth)acrylate (CEMA); aromatic and alkyl aromatic esters of (meth)acrylic acid, unsaturated vinyl esters of (meth)acrylic acid derived from fatty acids and fatty alcohols and combinations thereof.
- 15 21. The process according to claim 20, the aqueous emulsion polymer having a weight average molecular weight ranging from 1000 to 600,000.
- 20 22. The process according to claim 21, wherein the composition further comprises a blend of aqueous emulsion polymers, each polymer having from 0.01% to 5% by weight of at least one ionic monomer and from 95% to 99.99% of two or more hydrophobic monomers, and one or more optional cross-linking agents.
- 25 23. The process according to claim 22, wherein the composition is in the form of a solid or liquid selected from the group consisting of spray dried powders, freeze dried powders, granules, films, water-borne latex dispersions and combinations thereof.
- 30 24. The process according to claim 23, wherein the oily substance or hydrophobic material is selected from the group consisting of body oils, sebum, squalene, proteins, protein containing substances, food, blood, fat, fatty acids, waxes, mineral oils, silicone oils, motor oils, crude oils, organic compounds, lipophilic toxins, pesticides, insecticides, herbicides, greases, vegetable oils and
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combinations thereof; wherein the substrates are selected from the group consisting of textiles, fabric, hard surfaces, ceramics, wood, tile asphalt, cement, skin and combinations thereof; and wherein the carriers are selected from the group consisting of plastics sheets, cosmetic strips, fibers, textiles, filter materials, paper products, inorganic solids, detergents, cleaners, soaps and combinations thereof